Ruptured Appendicitis in Femoral Hernias:

Report of Two Cases and Review of the Literature

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HERNIATION of portions of the intestinal tract into femoral hernias is less common than the omentum. Small gut, colon, Meckle's diverticulum,[6] and even stomach,[11] have been found in the sac. Herniation of the appendix into a femoral hernia is rare: Wakeley[12] reports an incidence of less than one per cent in a personal series of 655 femoral hernia repairs. Inflammation of a femoral canal appendix is even less common; De Garengot[3] is credited with the first case report in 1731. In 1735 Amyand[1] carried out the first recorded appendectomy by removing a perforated appendix in an inguinal hernia. In 1954 Ryan[10] collected 537 hernias containing the vermiform appendix; 0.13 per cent of all cases of acute appendicitis occur in a hernia. By 1968, 240 cases of the vermiform appendix in a femoral hernia were collected.[5] We reviewed the English language literature and found 59 cases of acute appendicitis in a femoral hernia. In only 5 of these cases had the appendix ruptured inside the femoral hernia.[2,4,7,8,13] We have treated 2 such patients, bringing the total to 7. Table 1 briefly summarizes these patients.

Case Reports

Patient 1. A 59–year–old housewife was referred for investigation of a right inguinal sinus tract. Fifteen years before admission she had noted the appearance of a tender mass in the right groin which drained spontaneously and then healed. The mass became inflamed again 13 years later, and was at this time diagnosed as an inguinal abscess and drained surgically. A draining sinus persisted for the next 2 years. On admission the only remarkable finding was a chronic fistula in the right groin, discharging some odorless fluid. No inflammation or skin digestion was seen. A barium examination of the small bowel revealed normal ileum and cecum, and an appendico-cutaneous fistula. An appendectomy, excision of the fistula tract, and repair of the femoral hernia were carried out. Fig. 1 shows the operative findings. The right groin has remained healed for a 15 year follow-up period.

Patient 2. A 76–year–old diabetic lady was admitted with an inflamed right groin mass of unknown duration. There had been no change in gastrointestinal function; examination revealed a confused dehydrated lady in diabetic ketoacidosis. There was a crepitant right groin swelling with cellulitis extending from the right labium major to the anterior superior iliac spine and down the medial side of the thigh. The overlying skin showed blebs and necrotic areas. Fig. 2 shows an X-ray demonstrating subcutaneous emphysema. Bowel sounds were normal. Following resuscitation with fluids, electrolytes, insulin and antibiotics she was taken to the operating room where wide excision of necrotic tissue was carried out. Fig. 3 shows the operative findings. A perforated appendix was found in the femoral canal and a transabdominal appendectomy was carried out. The hernial site was packed open. After an initial difficult post-operative course, she recovered, began to eat, and formed granulation tissue in the wound. She died suddenly on the 11th post-operative night. Blood cultures were sterile and an autopsy failed to reveal the cause of death.

Discussion

Because of its rarity and atypical presentation, the correct diagnosis in this condition is difficult and seldom made. Of the 59 reported cases of appendicitis in a femoral hernia, only one author claims to have made the correct diagnosis pre-operatively,[9] and in none of the cases with a ruptured appendix has the correct diagnosis been made initially. In our first patient, a barium meal enabled the diagnosis to be made before definitive surgery, but when first seen, she was also thought to have a groin abscess and was drained as such.

Our patients illustrate the acute (patient 2) and chronic (patient 1) presentation of this rare lesion. It is a

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TABLE 1. *Clinical Features of Reported Ruptured Appendicitis in Femoral Hernias*

Author	Year	Sex	Age	Site	Duration of Symptoms
Waring[13]	1891	F	46	right groin	2 years chronic 1 day acute
Hodgson[7]	1925	F	70	right groin	8 months
Holliday[8]	1953	F	57	right groin	2 weeks
Carey[2]	1967	M	48	right groin	5 months chronic 5 days acute
Gerami[4]	1970	M	71	right groin	5 months
Voitk	1973	F	59	right groin	15 years
Voitk	1973	F	76	right groin	unknown—? 6 months

disease of post-menopausal women. The youngest patient previously reported (Table 1) is 46; our first patient, although 59 when first seen by us, was 44 at the time of her first symptoms. Femoral hernia occurs with a female: male sex ratio of 6:1. The sex ratio in the 59 reported cases of appendicitis in femoral hernias is similar. Female predominance persists in the cases of ruptured appendicitis in femoral hernias, but is less pronounced probably because of the small number of cases. Thus one may conclude that the incidence of herniation of the appendix into femoral hernias, its inflammation and rupture is similar in both sexes and parallels the incidence of femoral hernias.

It is interesting to speculate whether the appendicitis arises spontaneously or secondarily to obstruction at the hernial neck. In any case, the tight neck serves to wall off the disease and thus often prevents the generalised

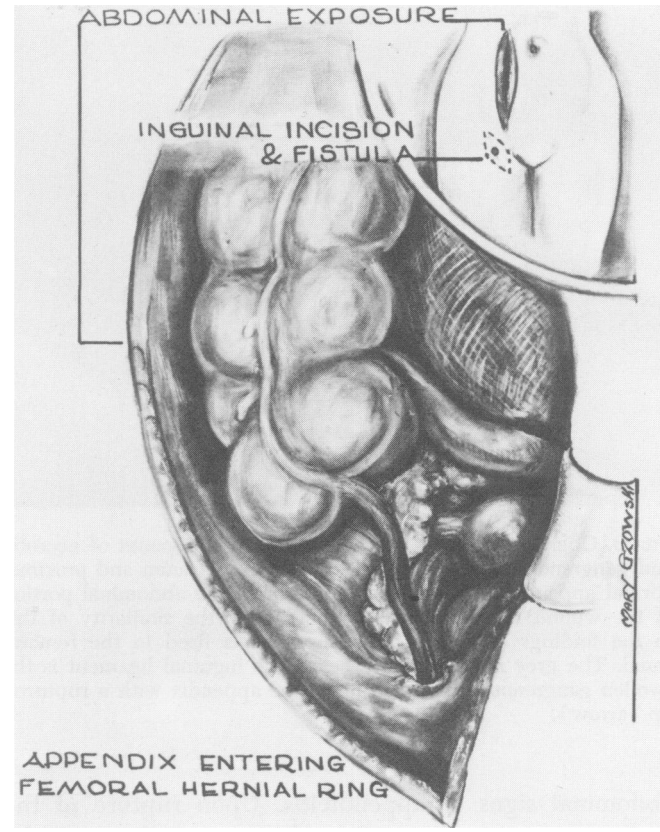

FIG. 1. Artist's sketch of operative findings in case 1. The appendix is adherent to the femoral canal and a well-established fistula is completely isolated from the abdominal cavity.

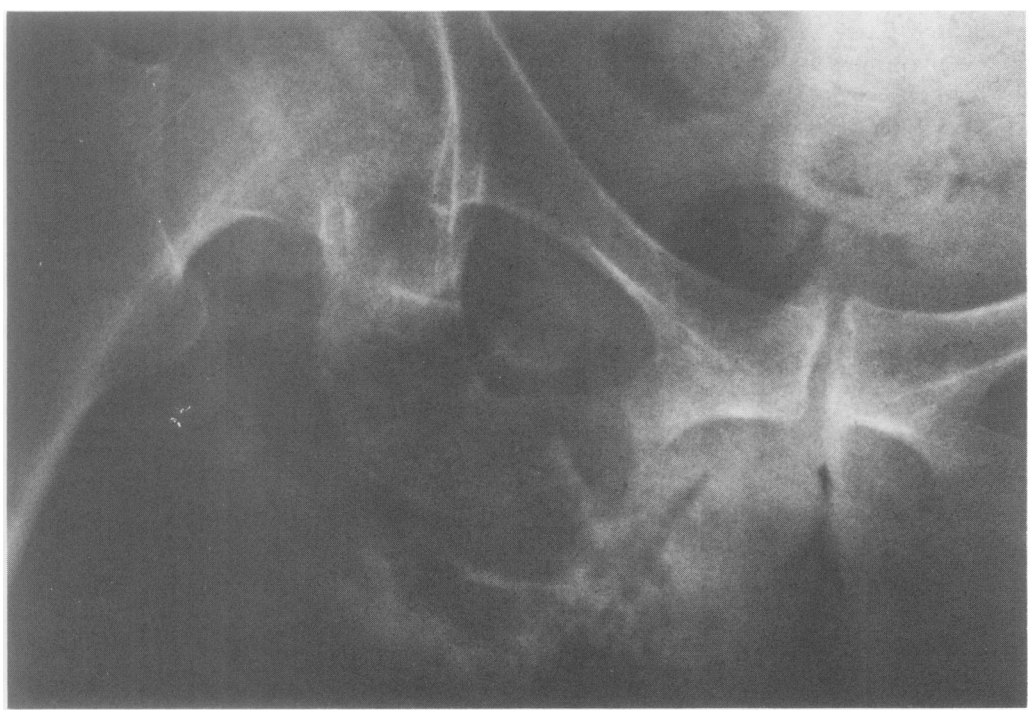

FIG. 2. X-ray of the lesion in patient 2 on admission. The presence of subcutaneous emphysema should alert the physician to ruptured bowel communicating with the subcutaneous tissues.

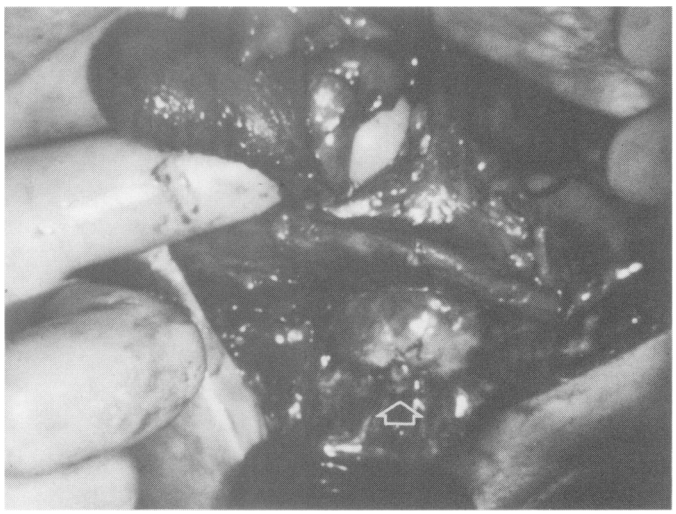

FIG. 3. Operative findings of patient 2. A large amount of necrotic and gangrenous tissue had to be excised. The cecum and proximal normal appendix are demonstrated through the abdominal portion of the wound by the surgeon's hand. Note the similarity of this to the findings of Fig. 1. The appendix is fixed to the femoral canal. The grey mass medially below the inguinal ligament is the swollen gangrenous distal portion of the appendix with a ruptured tip (arrow).

abdominal signs of appendicitis. Upon rupture of the organ, peritonitis does not result. Because the appendix does not interrupt bowel continuity, bowel function remains normal. The localized rupture soon expresses itself as a soft tissue infection leading to abscess formation. Gas producing organisms do not cause spontaneous abscesses. Thus, the finding of subcutaneous gas, a "wind abscess," must indicate ruptured bowel, and if bowel function is present, the appendix is a likely source. In our second patient, additional gas may have been produced by gas-forming organisms released following rupture, as the condition was a long-standing one due to patient's self-neglect. Coliforms only were grown on culture, but smears revealed both gram negative and gram positive bacilli. If drainage is established, whether spontaneously or surgically due to misdiagnosis, the condition follows a very benign and innocuous course. This is well illustrated by our first patient who did not manifest any of the toxic and life-threatening signs seen in the second patient. A recurrent or persistent fistula can be definitively dealt with on an elective basis and a hernia repair effected at the same time.

Appendicitis in a femoral hernia should be suspected if a similar mass is found on the left side, as the appendix has been found in the left femoral hernial sac in the presence of a mobile cecum.[13] This could also occur if the patient has non-rotation of the mid gut loop or situs inversus abdominalis.

Summary and Conclusions

1. Ruptured appendicitis in a femoral hernia is very rare. The 5 cases previously reported in the English language literature are reviewed and two new cases are added.

2. This condition is frequently misdiagnosed. The typical patient is a post-menopausal woman, although 2 of the reported cases are men, with an inflammatory mass in the right groin demonstrating subcutaneous gas in the presence of normal bowel function.

3. If misdiagnosed as an abscess, early incision and drainage may be life-saving. The ensuing fecal fistula may be electively treated by fistulectomy, appendectomy and herniorraphy when diagnosed.

References

1. Amyand, C.: Of an Inguinal Rupture, with a Pin in the Appendix Coeci, Incrusted with Stone; and Some Observations on Wounds in the Guts. Phil. Trans. Royal Soc., **39**: 329, 1736.
2. Carey, L. C.: Acute Appendicitis Occurring in Hernias: A Report of 10 Cases. Surgery, **61**:236, 1967.
3. De Garengot, cited by Garland, E. A.: Femoral Appendicitis. J. Indiana Med. Assoc., **48**:1292, 1955.
4. Gerami, S., Easley, G. W. and Mendoza, C. B. Jr.: Appendiceal Abscess as Contents of Right Femoral Hernia. A Case Report. Internat. Surg., **53**:354, 1970.
5. Griffin, J. M.: Incarcerated Inflamed Appendix in a Femoral Hernia Sac. Am. J. Surg., **115**:364, 1968.
6. Harf, A.: Einklemmung des Meckelschen Divertikels in einer Schenkelhernie. Deutsche Med. Wochenschr., **45**:881, 1919.
7. Hodgson, N.: Strangulated Femoral Hernia Associated with an Appendix Abscess in the Hernial Sac. Brit. J. Surg., **13**:386, 1925.
8. Holliday, T. D. S. and White, J. R. A.: Inflamed Appendices in Femoral Hernial Sacs. Brit. Med. J., **11**:779, 1953.
9. Powell, H. D. W.: Gangrenous Appendix in Femoral Hernial Sac. Lancet, **267**:1211, 1954.
10. Ryan, W. J.: Hernia of the Vermiform Appendix. Ann. Surg., **106**:135, 1937.
11. Spiegel, B.: Einklemmung des Magens im Schenkelbruch. Zentalbl F. Chir., **47**:373, 1920.
12. Wakeley, C. P. G.: Hernia of the Vermiform Appendix. *In* Maingot R: Abdominal Operations. New York, Appleton-Century-Crofts, 1969, p. 1288.
13. Waring, H. J. and McAdam Eccles, W.: Cases from Mr. Langton's Wards. St. Bart's Hosp. Rep., **27**:179, 1891.